

U.S. Patent Application No. 09/823,196

**Remarks****Disposition of Claims**

Claims 13-15, 17, 18, 20-27, 29, 31-38, 41, 42, 44-53, 55-66 are pending.

Claims 1-12, 16, 19, 28, 30, 39, 40, 43 and 54 are hereby canceled herein without prejudice.

Claims 13-15, 17, 18, 20, 21, 24-26, 29, 31, 42, 44-48, 50-53, 55-62, 64-66 are herein amended.

**Clean Copy of Pending Claims**

For the Examiner's convenience, and due to the numerous claim amendments herein made, applicant has provided, in Appendix A, a clean version of pending claims.

**Formal Drawings in Accordance with 37 CFR § 1.85**

Applicant acknowledges acceptance of the drawings received by the Office on September 18, 2001.

**Election/Restriction**

Applicant respectfully acknowledges the withdrawal of the November 13, 2003 Restriction Requirement.

**Claim Objections****Under 37 CFR §1.75(c)**

Claim 60 was objected to under 37 CFR §1.75(c), as being of improper dependent form.

In response, the dependency of claim 60 has been amended to depend from claim 59, thereby setting forth appropriate antecedent basis for the metalloamide source reagent compound limitation of such claim.

**Allowable Subject Matter**

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Claims 17, 18, 21, 24-30, 40-42, 52, 54 and 56-60 were objected to as being dependent upon a rejected base claim, but were to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response claims 21, 24, 26, 41, 42, 52, 56, 57, 58, and 59 have been rewritten in independent form to include all the limitations of their base claim and any intervening claim(s) from which they depend; claims 28, 30, 40 and 54 have been cancelled herein without prejudice; and claims 17, 18, 25, 27, 29 and 60 have been amended to depend from independent claims identified as allowable by Examiner Nazario Gonzalez.

#### Claim Rejection Under 35 USC § 112

Claim 31 was rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, it appeared as though text was missing from the end of the claim as the claim failed to end with a period and rather, ended with "n is from 1-6; and".

In response, applicant has amended claim 31 to delete "; and" and has replaced therewith a period.

#### Claim Rejections Under 35 U.S.C. §§ 102(b) and 102(e)

In the February 26, 2004 Office Action, the following claim rejections were set forth:

(6) Claims 1, 5-8, 10, 11, 19, 39, 43-51, 53, 55 and 61-66 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,159,855 to Brian A. Vaartstra et al., (hereinafter referred to as "Vaartstra");

(7) Claims 1, 11, 39, 43, 44, 65 and 66 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,583,205 to William S. Rees, (hereinafter referred to as "Rees");

(8) Claims 20, 22 and 23 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,593,741 to Yasuo Ikeda, (hereinafter referred to as "Ikeda");

(9) Claims 1, 2, 4, 5 and 39 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,015,917 to Gautam Bhandari et al., (hereinafter referred to as "Bhandari");

(10) Claims 1, 43 and 44 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,139,825 to Roy G. Gordon et al., (hereinafter referred to as "Gordon");

(11) Claims 1 and 39 were rejected under 35 U.S.C. §102(b) as being anticipated by Linde et al., *Zeitschrift für Anorganische und Allgemeine Chemie*, Volume 409, pages 199-214 (1974), (hereinafter referred to as "Linde");

(12) Claims 1, 2, 5, 6 and 39 were rejected under 35 U.S.C. §102(b) as being anticipated by Bradley et al., *Journal of the Chemical Society*, October 1960, pages 3857-3861, (hereinafter referred to as "Bradley 1"; and

(13) Claims 1, 2, 5 and 39, were rejected under 35 U.S.C. §102(b) as being anticipated by Bradley et al., *Canadian Journal of Chemistry*, Volume 40, July 1962, pages 1355-1360, (hereinafter referred to as "Bradley 2");

Consistent with the cancellation herein of claims 1-12, 16, 19, 28, 30, 39, 40, 43 and 54 applicant respectfully requests withdrawal of the 35 U.S.C. § 102(e) and 35 U.S.C. § 102(b) rejections corresponding to claims based on Vaartstra, Rees, Ikeda, Bhandari, Gordon, Linde, Bradley 1 and Bradley 2. Specifically rejections, 9, 11, 12 and 13 as identified hereinabove as well as in the February 26, 2004 Office Action are moot in light of the cancellation of such claims.

In response to the remaining rejections identified hereinabove as 6, 7, 8 and 10, applicant respectfully traverses the rejections in application to the claims as now amended, and in light of the ensuing remarks.

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. *Lindermann Maschinenfabrik GMBH v. American Hoist and Derrick Co.*, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). Vaartstra, Rees, Ikeda and Gordon do not meet this standard.

Thus, with specific reference to applicant's currently pending independent claims 20, 21, 24, 26, 41, 42, 52, 56, 57, 58 and 59, the Vaartstra, Rees, Ikeda and Gordon, references, do not describe,

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either expressly or inherently, each and every element as set forth in such claims. applicant's claimed invention.

Vaartstra is directed to organometallic precursors useful for chemical vapor deposition of multi-metallic films. At least two organometallic precursors are combined in a liquid or vapor state and deposited on a substrate. The precursors comprise at least one amino group such that at least two N-R bonds exist for each precursor molecule. R is disclosed as H or carbon. (See column 4, lines 54-57).

Rees is directed to a metalorganic chemical vapor deposition method for depositing an F-series or zinc metal onto a semiconductor from an F-series metal amide ligated to at least one amide ligand having the formula  $-NR^1R^2$ , wherein  $R^1$  and  $R^2$  are independently alkyl, alkenyl, aryl, or di- or trialkyl- substituted silyl, or together with the nitrogen atom to which they are attached comprise a heterocyclic ring. Rees discloses only the following compounds,  $Er(N(TMS)_2)_3$ ,  $La(N(TMS)_2)_3$ ,  $Y(N(TMS)_2)_3$ ,  $Pr(N(TMS)_2)_3$ ,  $Er(C_5H_5)_3$ .

Ikeda is directed to a plasma enhanced CVD process for depositing silicon oxide thin films from organosilicon compounds and oxygen gas. A plasma containing oxygen ions is produced such that oxygen ions in the plasma impinge on the substrate surface, while cyclically increasing and decreasing the density of the oxygen ions for short periods of time so as to form a surface layer of silicon oxide while the density of oxygen ions is decreased so thin as to be readily improved in film properties when the density of oxygen ions is again increased. Ikeda specifically discloses  $Si(OC_2H_5)_4$ ,  $Si(CH_3)_4$ ,  $SiH(OC_2H_5)_3$ ,  $Si_4O_4H_4(CH_3)_4$ ,  $Si_4O_{12}(CH_3)_8$ ,  $Si_4O_4H_4(CH_3)_4$ ,  $(CH_3)_3SiNHSi(CH_3)_3$ ,  $SiH[N(CH_3)_2]_3$ , and  $SiH[N(C_2H_5)_2]_3$ .

Gordon is directed to transition metal amido compounds for depositing transition metal nitride thin films by chemical vapor deposition. The metal amido compounds contain a dialkylamido or a cyclic-amido functional group. (See Column 1, lines 36-39). Three compounds are disclosed, specifically, tetrakis(piperidine) titanium, tetrakis(dimethyl)amido titanium,  $Ti[N(CH_3)_2]_4$ , and tert-butyl tris(dimethylamido) titanium,  $Ti[N(CH_3)_2]_3[CH_3]_3$ .

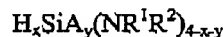
Independent claim 20, as amended, is directed to a CVD precursor composition, which includes an aminosilane source reagent compound comprising a silicon atom center, a silicon- nitrogen bond and at least one silicon - halogen bond.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer an aminosilane compound having a silicon atom center, a silicon-nitrogen bond and at least one silicon-halogen bond.

Independent claim 21, as amended, is directed to a CVD precursor composition including at least one of aminosilane source reagent compound selected from the group consisting of  $\text{Si}(\text{NMe}_2)_3\text{Cl}$ ,  $\text{Si}(\text{NEt}_2)_2\text{Cl}_2$ ,  $\text{Si}(\text{NMe}_2)_4$ , and  $\text{Si}(\text{NEt}_2)_4$ .

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds having any of the aforementioned compositions.

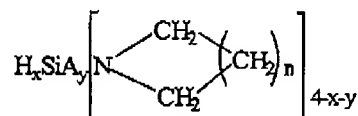
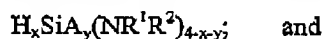
Independent claim 24, as amended is directed to a CVD precursor composition including at least one aminosilane source reagent compound having a formula:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is halogen; Y is from 0 to 3; N is nitrogen;  $\text{R}^1$  is methyl,  $\text{R}^2$  is ethyl; and n is from 1-6.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds having both a methyl and ethyl group bonded to an amino nitrogen.

Independent claim 26 is directed to a CVD precursor composition including at least one aminosilane source reagent compound selected from the group consisting of:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; each of  $\text{R}^1$  and  $\text{R}^2$  is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl,  $\text{C}_1$ - $\text{C}_8$  alkyl, and  $\text{C}_1$ - $\text{C}_8$  perfluoroalkyl; and n is from 1-6 and a

solvent medium selected from the group consisting of: ethers, glymes, tetraglymes, amines, polyamines, alcohols, glycols, aliphatic hydrocarbon solvents, aromatic hydrocarbon solvents, cyclic ethers and combinations of two or more of the foregoing.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds comprising a solvent medium.

Independent claims 41 and 42 are directed to CVD precursor compositions including both a metalloamide source reagent compound and an aminosilane source reagent compound.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer a combination of both a metalloamide source reagent compound and an aminosilane source reagent compound.

Independent claim 52 is directed to a CVD method of forming a dielectric thin film on a substrate, comprising, vaporizing a source reagent composition comprising at least one metalloamide precursor dissolved or suspended in octane.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds comprising a solvent medium.

Applicant's independent claim 56 is directed to a CVD method of forming a dielectric thin film on a substrate, comprising vaporizing a source reagent composition comprising  $\text{La}(\text{NMe}_2)$  and  $\text{Zr}(\text{NMe}_2)_4$ .

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds comprising a solvent medium.

Independent claim 57 is directed to a CVD method of forming a dielectric thin film on a substrate, comprising vaporizing a source reagent composition comprising  $\text{Y}(\text{NMe}_2)_3$ .

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer aminosilane compounds comprising a solvent medium.

Independent claim 58 is directed to a CVD method of forming a dielectric thin film on a substrate, comprising vaporizing a source reagent composition comprising  $\text{Hf}(\text{N}(\text{CH}_3)_2)_4$  and  $\text{La}(\text{N}(\text{CH}_3)_2)_3$ .

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer vaporizing a source reagent composition comprising  $\text{Hf}(\text{N}(\text{CH}_3)_2)_4$  and  $\text{La}(\text{N}(\text{CH}_3)_2)_3$ .

Independent claim 59 is directed to a CVD method of forming a dielectric thin film on a substrate, comprising vaporizing a source reagent composition comprising at least one metalloamide source reagent compound and at least one aminosilane source reagent compound.

Vaartstra, Rees, Ikeda and Gordon fail to teach, suggest or infer vaporizing a source reagent composition comprising at least one metalloamide source reagent compound and at least one aminosilane source reagent compound.

As none of Vaartstra, Rees, Ikeda and Gordon teach each and every element of each of applicant's independent claims 20, 21, 24, 26, 41, 42, 52, 56, 57, 58 and 59, the claimed invention, is therefore novel and not anticipated by any of the cited prior art references. Applicant therefore requests that the rejections of claims 13-15, 20, 22, 23, 31-38, 41, 44-51, 53, 55, 61-66 under 35 U.S.C. §§ 102(e) and 102(b) be withdrawn.

#### **Double Patenting Rejection**

In response to the February 26, 2004 double patenting rejection, wherein Examiner Porfirio, Nazario Gonzalez provisionally rejected claims 1, 2, 5-11, 16, 19 and 39, as being unpatentable over claims 1-3, 8-12, 16, 37 and 87-91 of copending Application No. 09/823,196, Applicant respectfully requests withdrawal of same in light of the cancellation herein of such claims.

**Petition Under 37 CFR 1.136 for Three Month Extension of Time**

Petition hereby is made under the provisions of 37 CFR 1.136 for a three month extension of the term for response to the February 26, 2004 Office Action, extending the term for response to August 26, 2004.

**Fees Due and Payable**

In connection with applicant's Petition Under 37 CFR 1.136 for Three Month Extension of Time, a fee of \$950 as specified in 37 CFR 1.17(a)(3), is hereby authorized to be deducted from the Deposit Account No. 50-0860 in the name of applicant, Advanced Technology Materials, Inc., 7 Commerce Drive, Danbury, CT 06810.

There are currently 46 claims pending, 11 of which are independent. Applicant's original filing papers included payment for 66 claims, of which 5 were independent. Accordingly, a fee of \$516 for addition of 6 independent claims at \$86 each, as specified in 37 CFR 1.16(b), is due and is hereby authorized to be deducted from the Deposit Account No. 50-0860 in the name of applicant, Advanced Technology Materials, Inc., 7 Commerce Drive, Danbury, CT 06810.

Applicant does not believe that any additional fees are due in connection with the foregoing. Should the Office determine however, that a fee or charge is payable in connection with the entry of this Amendment, or furtherance of the present application, the Office is hereby authorized to charge any such fee to Deposit Account No. 50-0860, in the name of Advanced Technology Materials, Inc..

**CONCLUSION**

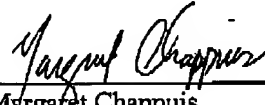
Applicants have now made an earnest attempt to place this case in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, applicants respectfully request reexamination and reconsideration of this application and full allowance of claims 13-15, 17, 18, 20-27, 29, 31-38, 41, 42, 44-53, 55-66.

In the event that any issues remain outstanding, incident to the formal allowance of the application, the Examiner is requested to contact the undersigned agent at (203) 739-1435 to discuss their resolution, in order that this application may be passed to issue at an early date.



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Respectfully submitted.



Margaret Chappuis  
Registration No. 45,735  
Agent for Applicants

Advanced Technology Materials Inc.  
7 Commerce Drive  
Danbury CT 06810  
Telephone (203) 794-1100 ext 4184  
Facsimile (203) 797-2544  
Attorney Docket No. 510 CIP

**APPENDIX A****CLAIMS UNITED STATES PATENT APPLICATION NO. 09/954,831**

(Claims 1 -12 are cancelled)

13. (currently amended) The CVD precursor composition according to claim 41, wherein the aminosilane source reagent compound is selected from the group consisting of:  $\text{Si}(\text{NMe}_2)_3\text{Cl}$ ,  $\text{Si}(\text{NEt}_2)_2\text{Cl}_2$ ,  $\text{Si}(\text{NMe}_2)_4$ , and  $\text{Si}(\text{NEt}_2)_4$ .

14. (currently amended) The CVD precursor composition according to claim 41, wherein the metalloamide source reagent compound and the aminosilane source reagent compound are injected by liquid delivery into a chemical vapor deposition chamber.

15. (currently amended) The CVD precursor composition according to claim 41, wherein the metalloamide source reagent compound and the aminosilane source reagent compound are delivered by bubbler into a chemical vapor deposition chamber.

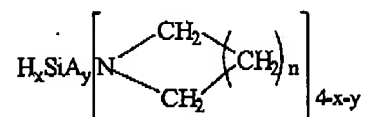
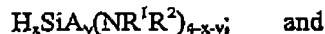
16 (cancelled)

17. (currently amended) The CVD precursor composition according to claim 41, wherein the precursor composition further comprises a solvent medium selected from the group consisting of: ethers, glymes, tetraglymes, amines, polyamines, alcohols, glycols, aliphatic hydrocarbon solvents, aromatic hydrocarbon solvents, cyclic ethers and combinations of two or more of the foregoing.

18. (currently amended) The CVD precursor composition according to claim 41, wherein the metalloamide source reagent compound is injected by liquid delivery into a chemical vapor deposition chamber.

19. (cancelled)

20. (currently amended) A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including at least one aminosilane source reagent compound selected from the group consisting of:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; each of R<sup>1</sup> and R<sup>2</sup> is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, and C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl; and n is from 1-6.

21. (currently amended) A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including at least one aminosilane source reagent compound selected from the group consisting of Si(NMe<sub>2</sub>)<sub>3</sub>Cl, Si(NEt<sub>2</sub>)<sub>2</sub>Cl<sub>2</sub>, Si(NMe<sub>2</sub>)<sub>4</sub>, and Si(NEt<sub>2</sub>)<sub>4</sub>.

22. (original) The CVD precursor composition according to claim 20, wherein R<sup>1</sup> and R<sup>2</sup> of the aminosilane are methyl.

23. (original) The CVD precursor composition according to claim 20, wherein R<sup>1</sup> and R<sup>2</sup> are ethyl.

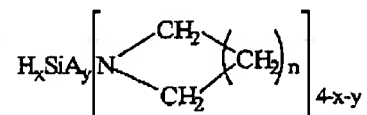
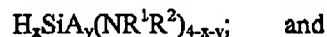
24. (currently amended) A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including at least one aminosilane source reagent compound having a formula:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is halogen; Y is from 0 to 3; N is nitrogen; R<sup>1</sup> is methyl, R<sup>2</sup> is ethyl; and n is from 1-6.

25. (currently amended) The CVD precursor composition according to claim 24-20, wherein the aminosilane source reagent compound is Si(NMeEt)<sub>4</sub>.

26. (currently amended) A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including at least one aminosilane source reagent compound selected from the group consisting of:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; each of R<sup>1</sup> and R<sup>2</sup> is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, and C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl; and n is from 1-6 and a solvent medium selected from the group consisting of: ethers, glymes, tetraglymes, amines, polyamines, alcohols, glycols, aliphatic hydrocarbon solvents, aromatic hydrocarbon solvents, cyclic ethers and combinations of two or more of the foregoing.

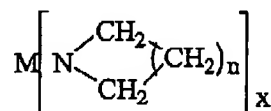
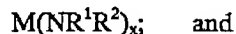
27. (original) The CVD precursor composition according to claim 26, wherein the solvent is octane.

28. (cancelled)

29. (currently amended) The CVD precursor composition according to claim 26, wherein the aminosilane source reagent compound is injected by liquid delivery into a chemical vapor deposition chamber.

30. (cancelled)

31. (currently amended) The CVD precursor of claim 26, wherein the precursor composition further comprises a metalloamide source reagent compound selected from the group consisting of:



wherein M is selected from the group consisting of: Zr, Hf, Y, La, Lanthanide series elements, Ta, Ti, Al; N is nitrogen; each of R<sup>1</sup> and R<sup>2</sup> is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl, alkylsilyl; and x is the oxidation state on metal M; and n is from 1-6.

32. (original) The CVD precursor composition according to claim 31, wherein R<sup>1</sup> and R<sup>2</sup> of the metalloamide source reagent are methyl.

33. (original) The CVD precursor composition according to claim 31, wherein R<sup>1</sup> and R<sup>2</sup> of the metalloamide source reagent compound are ethyl.

34. (original) The CVD precursor composition according to claim 31, wherein R<sup>1</sup> of the metalloamide source reagent compound is methyl and R<sup>2</sup> of the metalloamide source reagent compound is ethyl.

35. (original) The CVD precursor composition according to claim 31, wherein M is Zr.

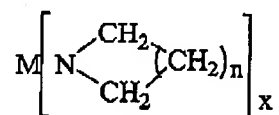
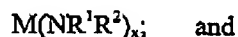
36. (original) The CVD precursor composition according to claim 31, wherein M is Hf.

37. (original) The CVD precursor composition according to claim 31, wherein the metalloamide source reagent compound is selected from the group consisting of: Zr(NMe<sub>2</sub>)<sub>4</sub>, Zr(NMeEt)<sub>4</sub>, Zr(NEt<sub>2</sub>)<sub>4</sub>, Ta(NEt<sub>2</sub>)<sub>5</sub>, Ta(NMe<sub>2</sub>)<sub>5</sub>, Ta(NMeEt)<sub>5</sub>, Zr(NiPr<sub>2</sub>)<sub>4</sub>, Zr(NMe<sub>2</sub>)<sub>2</sub>(NPr<sub>2</sub>)<sub>2</sub>, Zr(NC<sub>6</sub>H<sub>12</sub>)<sub>4</sub>, Zr(NEt<sub>2</sub>)<sub>2</sub>(NPr<sub>2</sub>)<sub>2</sub>, Hf(NEt<sub>2</sub>)<sub>4</sub>, Hf(NMe<sub>2</sub>)<sub>4</sub>, Hf(NMeEt)<sub>4</sub>, La(NMe<sub>2</sub>)<sub>3</sub>, La(NEt<sub>2</sub>)<sub>3</sub>, La(NMeEt)<sub>3</sub>, Al(NMe<sub>2</sub>)<sub>3</sub>, Al(NEt<sub>2</sub>)<sub>3</sub>, Y(NMe<sub>2</sub>)<sub>3</sub>, Y(NEt<sub>2</sub>)<sub>3</sub>, Y(NMeEt)<sub>3</sub>, Ti(NMe<sub>2</sub>)<sub>4</sub>, Ti(NEt<sub>2</sub>)<sub>4</sub>, Ti(NMeEt)<sub>4</sub>, Ta(NMe<sub>2</sub>)<sub>5</sub>, Ta(NEt<sub>2</sub>)<sub>5</sub>.

38. (original) The CVD precursor composition according to claim 31, wherein the metalloamide source reagent compound is selected from the group consisting of Zr(NMe<sub>2</sub>)<sub>4</sub>, Zr(NEt<sub>2</sub>)<sub>4</sub>, Zr(NMeEt)<sub>4</sub>, Hf(NEt<sub>2</sub>)<sub>4</sub>, Hf(NMe<sub>2</sub>)<sub>4</sub> and Hf(NMeEt)<sub>4</sub>.

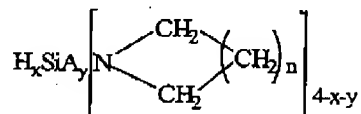
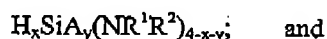
Claims 39 and 40 cancelled.

41. (original) A CVD precursor composition for forming a thin film dielectric on a substrate, such precursor composition including a vapor source reagent mixture including a metalloamide source reagent compound selected from the group consisting of:



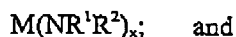
wherein M is selected from the group consisting of: Zr, Hf, Y, La, Lanthanide series elements, Ta, Ti, Al; N is nitrogen; each of  $R^1$  and  $R^2$  is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl,  $C_1$ - $C_8$  alkyl,  $C_1$ - $C_8$  perfluoroalkyl, alkylsilyl; and x is the oxidation state on metal M; and n is from 1-6; and

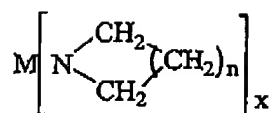
an aminosilane source reagent compound selected from the group consisting of:



wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; each of  $R^1$  and  $R^2$  is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl,  $C_1$ - $C_8$  alkyl, and  $C_1$ - $C_8$  perfluoroalkyl; and n is from 1-6; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; n is from 1-6.

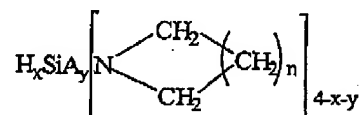
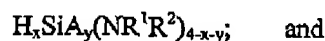
42. (currently amended) A CVD multi-component, single source reagent composition useful for forming a silicate thin film dielectric on a substrate, the source reagent composition comprising at least one metalloamide vapor source reagent compound selected from the group consisting of:





wherein M is selected from the group consisting of: Zr, Hf, Y, La, Lanthanide series elements, Ta, Ti, Al; N is nitrogen; each of R<sup>1</sup> and R<sup>2</sup> is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl, alkylsilyl; and x is the oxidation state on metal M; and n is from 1-6; and

an aminosilane vapor source reagent compound selected from the group consisting of:

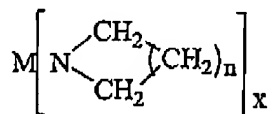
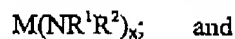


wherein H is hydrogen; x is from 0 to 3; Si is silicon; A is a halogen; Y is from 0 to 3; N is nitrogen; each of R<sup>1</sup> and R<sup>2</sup> is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl, C<sub>1</sub>-C<sub>8</sub> alkyl, and C<sub>1</sub>-C<sub>8</sub> perfluoroalkyl; and n is from 1-6; and

a solvent medium in which the metalloamide compound and the aminosilane compound are soluble or suspendable.

43. (cancelled)

44. (currently amended) The method according to claim 59, wherein the metalloamide source reagent compound is selected from the group consisting of:



wherein M is selected from the group consisting of: Zr, Hf, Y, La, Lanthanide series elements, Ta, Ti, Al; N is nitrogen; each of  $R^1$  and  $R^2$  is same or different and is independently selected from the group consisting of H, aryl, perfluoroaryl,  $C_1-C_8$  alkyl,  $C_1-C_8$  perfluoroalkyl, alkylsilyl; and x is the oxidation state on metal M; and n is from 1-6.

45. (currently amended) The CVD method according to claim 59, wherein the source reagent composition is vaporized in a liquid delivery apparatus.
46. (currently amended) The CVD method according to claim 59, wherein the source reagent vapor is transported into the chemical vapor deposition chamber in a pulsed deposition mode.
47. (currently amended) The CVD method according to claim 59, wherein the dielectric thin film is deposited in the absence of an oxidizer.
48. (currently amended) The CVD method according to claim 59, wherein the source reagent vapor further comprises a co-reactive gas.
49. (original) The CVD method according to claim 48, wherein the co-reactive gas is selected from the group consisting of ozone, water vapor and reactive alcohols.
50. (currently amended) The CVD method according to claim 43 59, wherein the metalloamide source reagent compound is selected from the group consisting of:  $Zr(NMe_2)_4$ ,  $Zr(NEt_2)_4$ ,  $Zr(NMeEt)_4$ ,  $Hf(NMe_2)_4$ ,  $Hf(NEt_2)_4$ , and  $Hf(NMeEt)_4$ .
51. (currently amended) The CVD method according to claim 42 59, wherein the metalloamide source reagent compound is  $Hf(NMe_2)_4$ .
52. (currently amended) A CVD method of forming a dielectric thin film on a substrate, comprising the steps of:

vaporizing a source reagent composition comprising at least one metalloamide precursor dissolved or suspended in octane, to form a source reagent precursor vapor;



transporting the source reagent precursor vapor into a chemical vapor deposition zone, optionally using a carrier gas;

contacting the source reagent precursor vapor with a substrate in the chemical vapor deposition zone at elevated temperature, to deposit a dielectric thin film on the substrate.

53. (currently amended) The CVD method according to claim 59, wherein the metalloamide source reagent compound is solubilized or suspended in a solvent.

54. (cancelled)

55. (currently amended) The CVD method according to claim 59, wherein the metalloamide source reagent compound is  $\text{Zr}(\text{NMe}_2)_4$ .

56. (currently amended) A CVD method of forming a dielectric thin film on a substrate, comprising the steps of:

vaporizing a source reagent composition comprising  $\text{La}(\text{NMe}_2)_3$  and  $\text{Zr}(\text{NMe}_2)_4$  to form a source reagent precursor vapor;

transporting the source reagent precursor vapor into a chemical vapor deposition zone, optionally using a carrier gas;

contacting the source reagent precursor vapor with a substrate in the chemical vapor deposition zone at elevated temperature to deposit a dielectric thin film on the substrate.

57. (currently amended) A CVD method of forming a dielectric thin film on a substrate, comprising the steps of:

vaporizing a source reagent composition comprising  $\text{Y}(\text{NMe}_2)_3$ , to form a source reagent precursor vapor;

transporting the source reagent precursor vapor into a chemical vapor deposition zone, optionally using a carrier gas;

contacting the source reagent precursor vapor with a substrate in said chemical vapor deposition zone at elevated temperature to deposit a dielectric thin film on the substrate.

58. (currently amended) A CVD method of forming a dielectric thin film on a substrate, comprising the steps of:

vaporizing a source reagent composition comprising  $\text{Hf}(\text{N}(\text{CH}_3)_2)_4$  and  $\text{La}(\text{N}(\text{CH}_3)_2)_3$ , to form a source reagent precursor vapor;

transporting the source reagent precursor vapor into a chemical vapor deposition zone, optionally using a carrier gas;

contacting the source reagent precursor vapor with a substrate in the chemical vapor deposition zone at elevated temperature to deposit a dielectric thin film on the substrate.

59. (currently amended) A CVD method of forming a dielectric thin film on a substrate, comprising the steps of:

vaporizing a source reagent composition comprising at least one metalloamide source reagent compound and at least one aminosilane source reagent compound, to form a source reagent precursor vapor;

transporting the source reagent precursor vapor into a chemical vapor deposition zone, optionally using a carrier gas;

contacting the source reagent precursor vapor with a substrate in said chemical vapor deposition zone at elevated temperature to deposit a dielectric thin film on the substrate.

60. (currently amended) The CVD method according to claim 59, wherein the metalloamide source reagent compound is  $\text{Hf}(\text{NMe}_2)_4$  and the aminosilane source reagent compound is  $\text{Si}(\text{NMe}_2)_3\text{Cl}$ .

61. (currently amended) The CVD method according to claim 59, wherein the carrier gas is selected from the group consisting of: He, Ar,  $\text{H}_2$ ,  $\text{N}_2$  and  $\text{O}_2$ .

62. (currently amended) The CVD method according to claim 59, further comprising an oxidizing gas selected from the group consisting of:  $O_2$ ,  $N_2O$ , NO and  $O_3$ .
63. (original) The CVD method according to claim 62, wherein the oxidizing gas is  $N_2O$ .
64. (currently amended) The CVD method according to claim 59, further comprising an oxidizing gas, wherein the oxidizing gas is  $N_2O$ .
65. (currently amended) The CVD method according to claim 59, wherein the metalloamide source reagent compound is vaporized at a temperature in a range of from about  $100^\circ\text{C}$  to about  $300^\circ\text{C}$ .
66. (currently amended) The CVD method according to claim ~~43~~ 59, wherein the temperature in the chemical vapor deposition zone is between about  $350^\circ\text{C}$  to about  $750^\circ\text{C}$ .